

LAHORE UNIVERSITY OF MANAGEMENT SCIENCES
Department of Electrical Engineering

EE240 Circuits I
Quiz 03 - Section 1

Name: _____

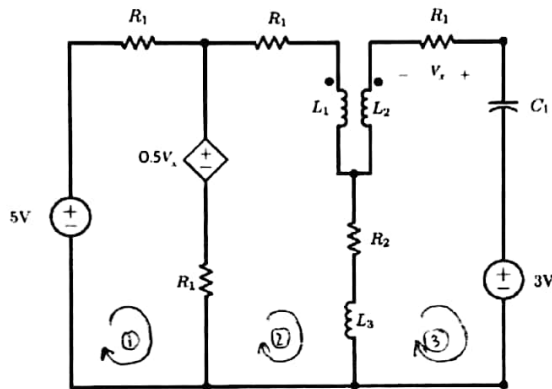
Campus ID: _____

Total Marks: 10

Time Duration: 15 minutes

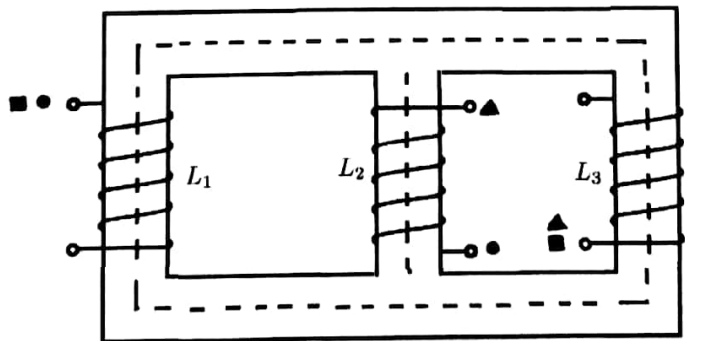
Question 1 (5 marks)

Consider the network in Figure below, where the inductors L_1 and L_2 are coupled with mutual inductance denoted by M . Write down the network equations using Kirchhoff voltage law.



Question 2 (5 marks)

The figure below show windings marked on a magnetic flux-conducting core. Mark the dots on the windings to establish the mutual coupling.



Q1-

$$\textcircled{1} \quad 4R_1 + 0.5V_x + R_1(i_1 - i_2) = 5$$

$$\textcircled{2} \quad i_2 R_1 + L_1 \frac{di_2}{dt} + R_2(i_2 - i_3) + L_3 \frac{d(i_2 - i_3)}{dt} + R_1(i_2 - i_1) - 0.5V_x - M \frac{di_3}{dt} = 0$$

$$\textcircled{3} \quad L_2 \frac{di_3}{dt} + i_3 R_1 + \frac{1}{C_1} \int i_3 dt + L_3 \frac{d(i_3 - i_2)}{dt} + R_2(i_3 - i_2) - M \frac{di_2}{dt} + 3 = 0$$

• $V_x = -i_3 R_1$